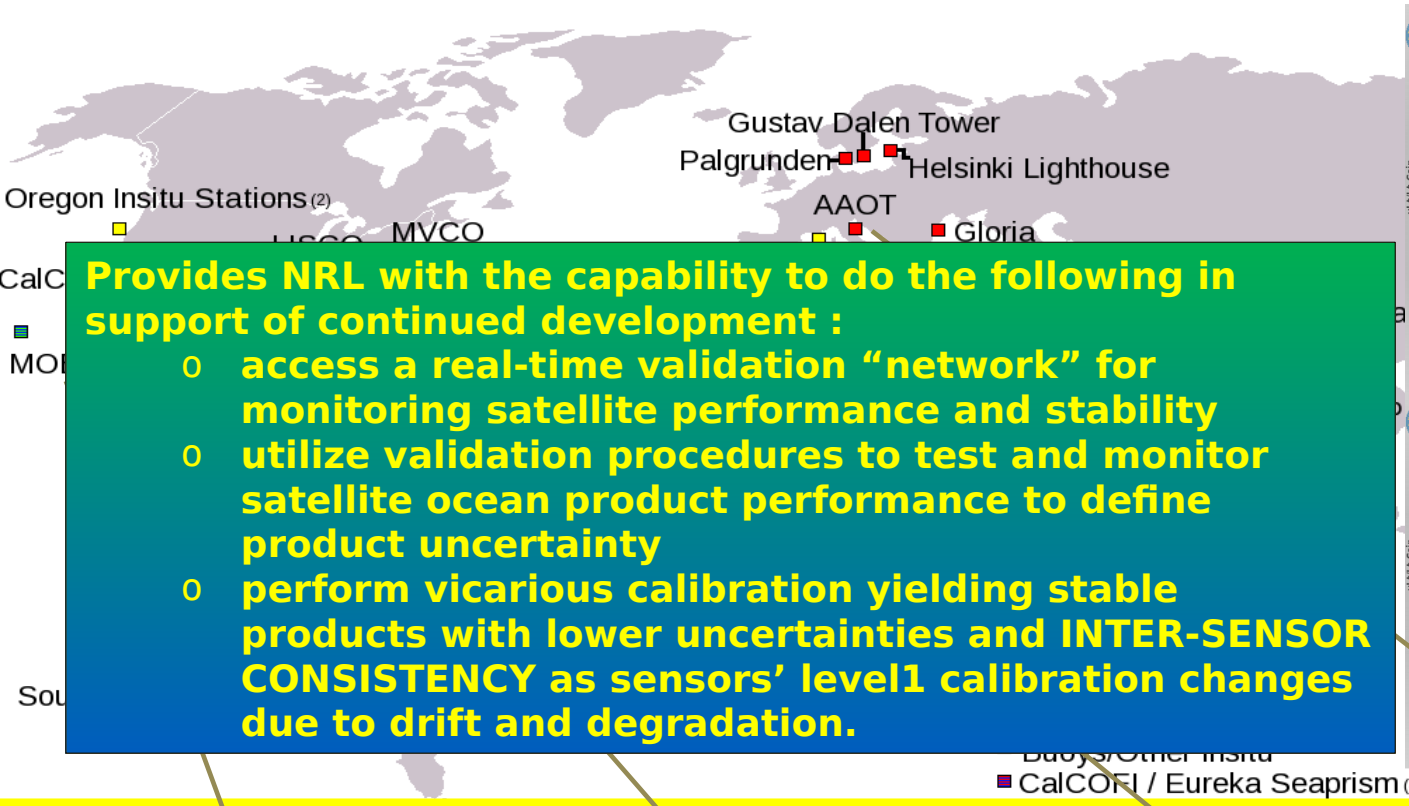
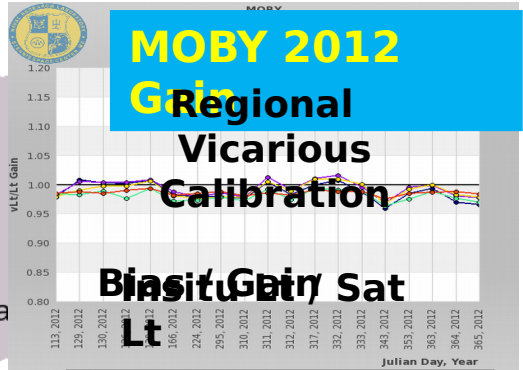
Aeronet Ocean Color (AOC) Network
Global Cal/Val Sites

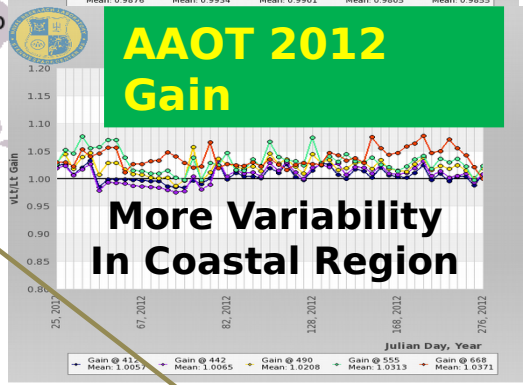
RT Updates to NRL Cal/Val SQL Database & Web Matchup Tool



Provides NRL with the capability to do the following in support of continued development :

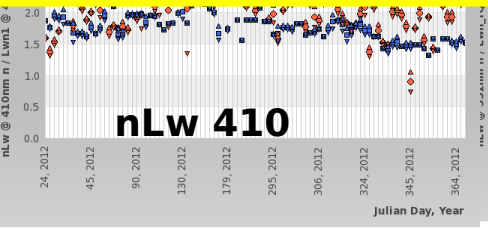
- access a real-time validation "network" for monitoring satellite performance and stability
- utilize validation procedures to test and monitor satellite ocean product performance to define product uncertainty
- perform vicarious calibration yielding stable products with lower uncertainties and INTER-SENSOR CONSISTENCY as sensors' level1 calibration changes due to drift and degradation.



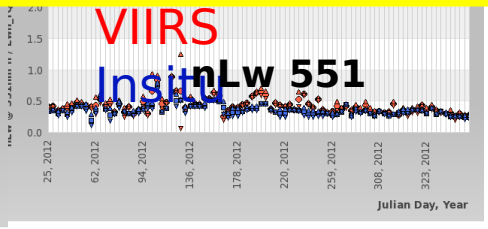


2012 VIIRS matchups:

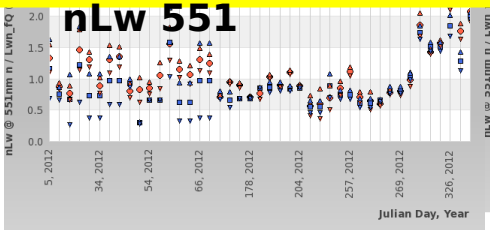
MOBY



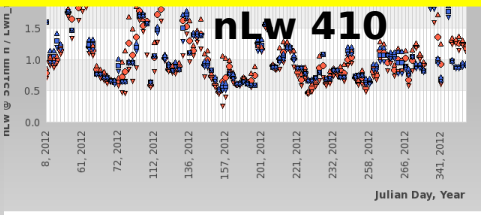
AAOT



Eureka

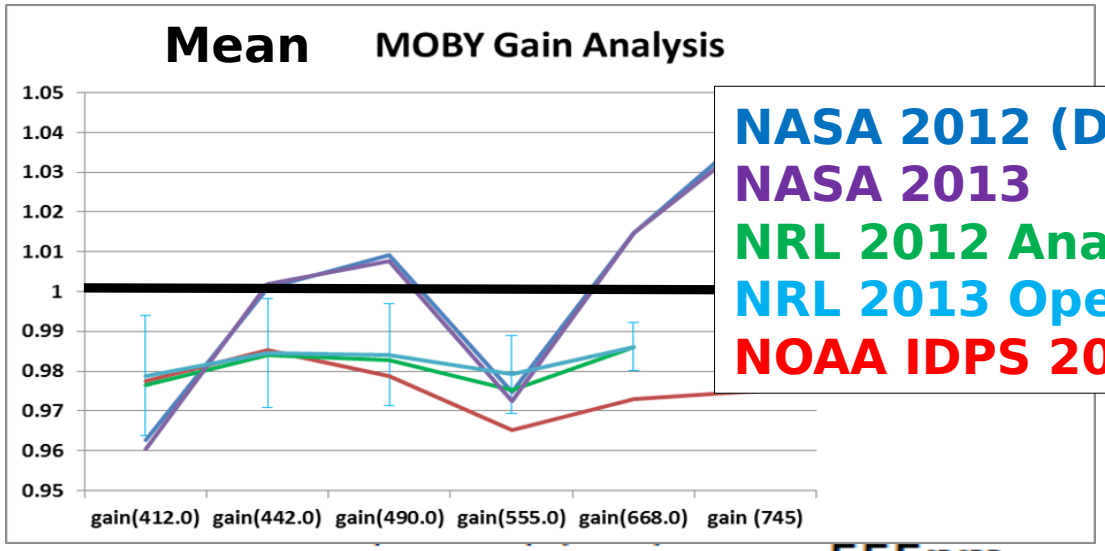


MVCO

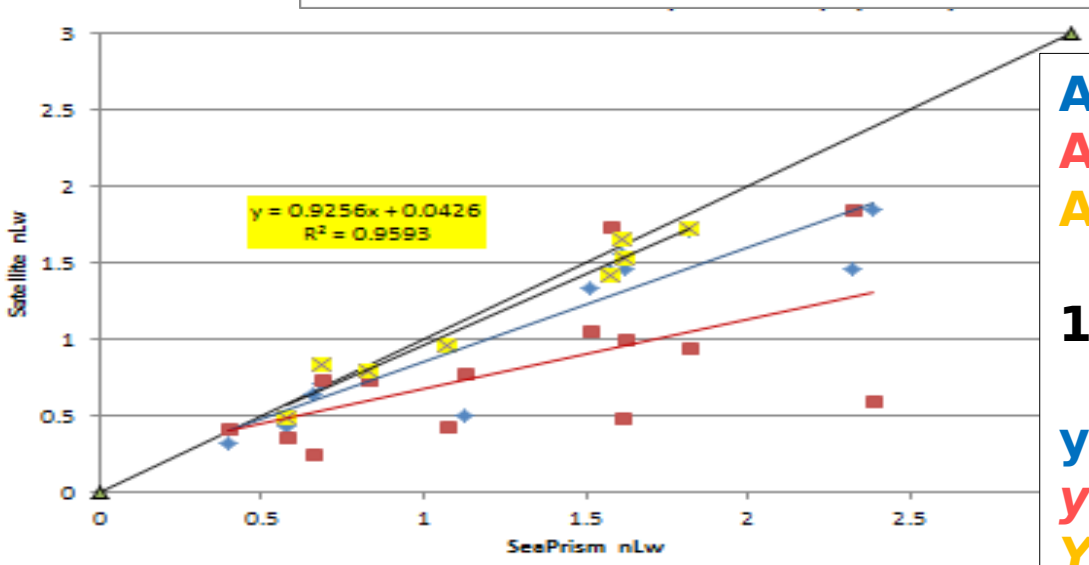


VIIRS Vicarious Calibration Evaluation (MOBY)
Variability in Temporal Gains

Vical
Tuning satellite
to match insitu
Ratio of Satellite
to Insitu should
(optimal = 1)
Correction for errors
Due to AtmCorr and
Sensor calibration
drift/degradation)



NASA 2012 (Diff Cal Methods
NASA 2013
NRL 2012 Analysis
NRL 2013 Operational
NOAA IDPS 2013

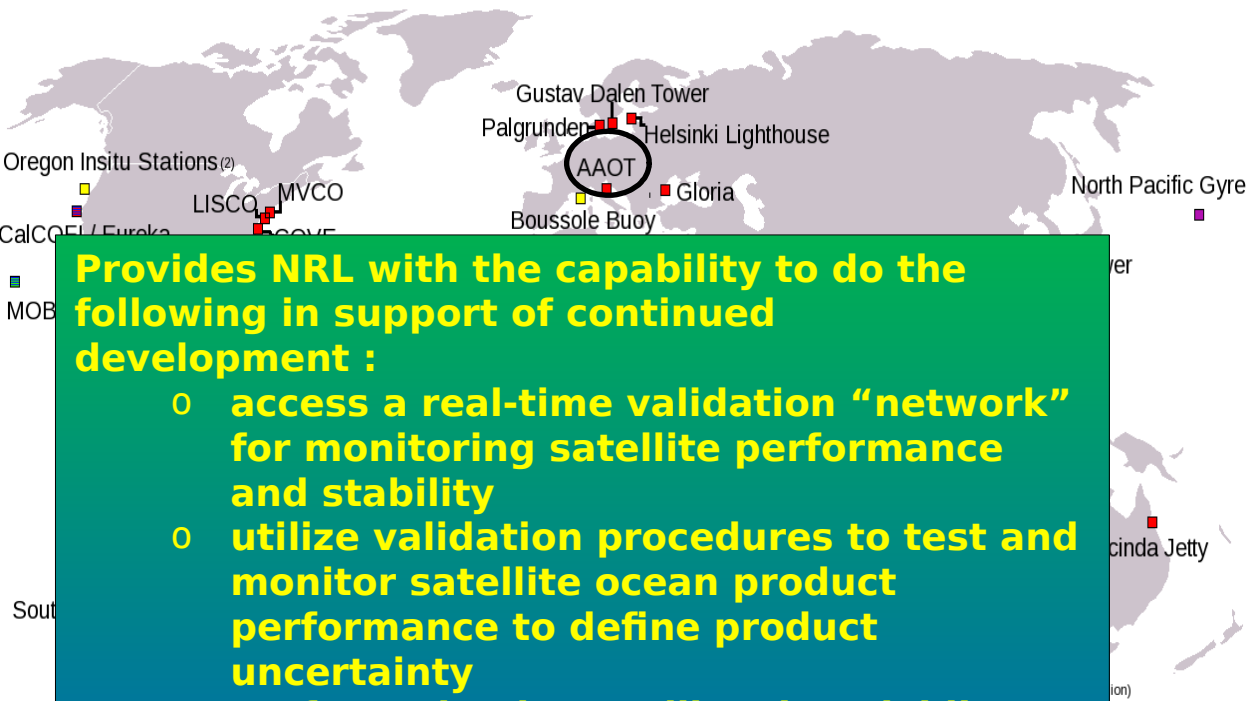


Aeronet : APS
Aeronet : NOAA IDPS
Aeronet : APS w/Gains

1:1

y = 0.75x + 0.11 r^2=0.84
y = 0.45x + 0.23 r^2=0.35
Y = 0.93x + 0.04 r^2=0.96

Cannot exchange or compare gains between systems



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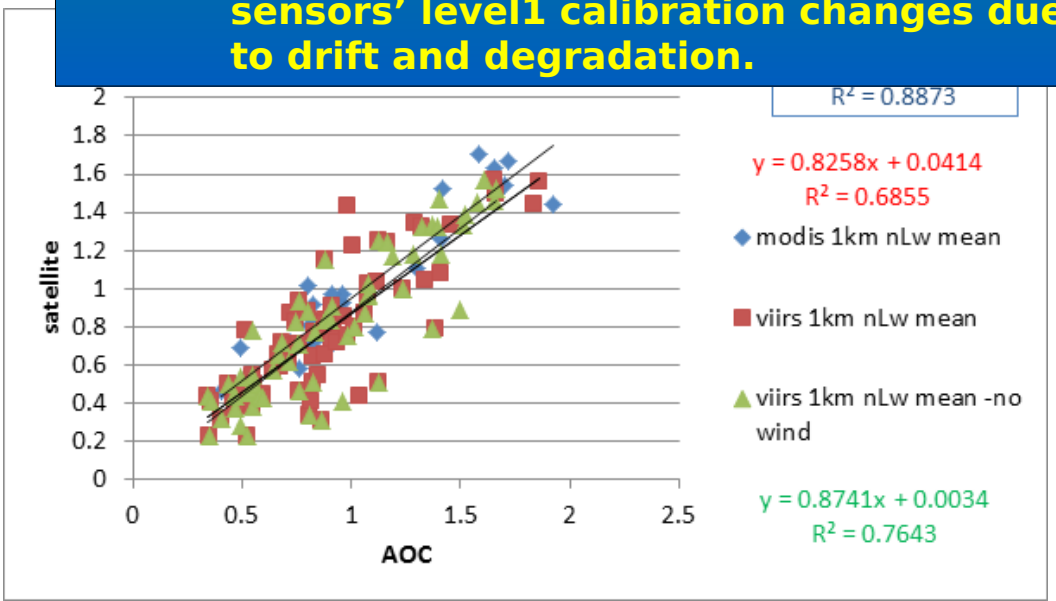
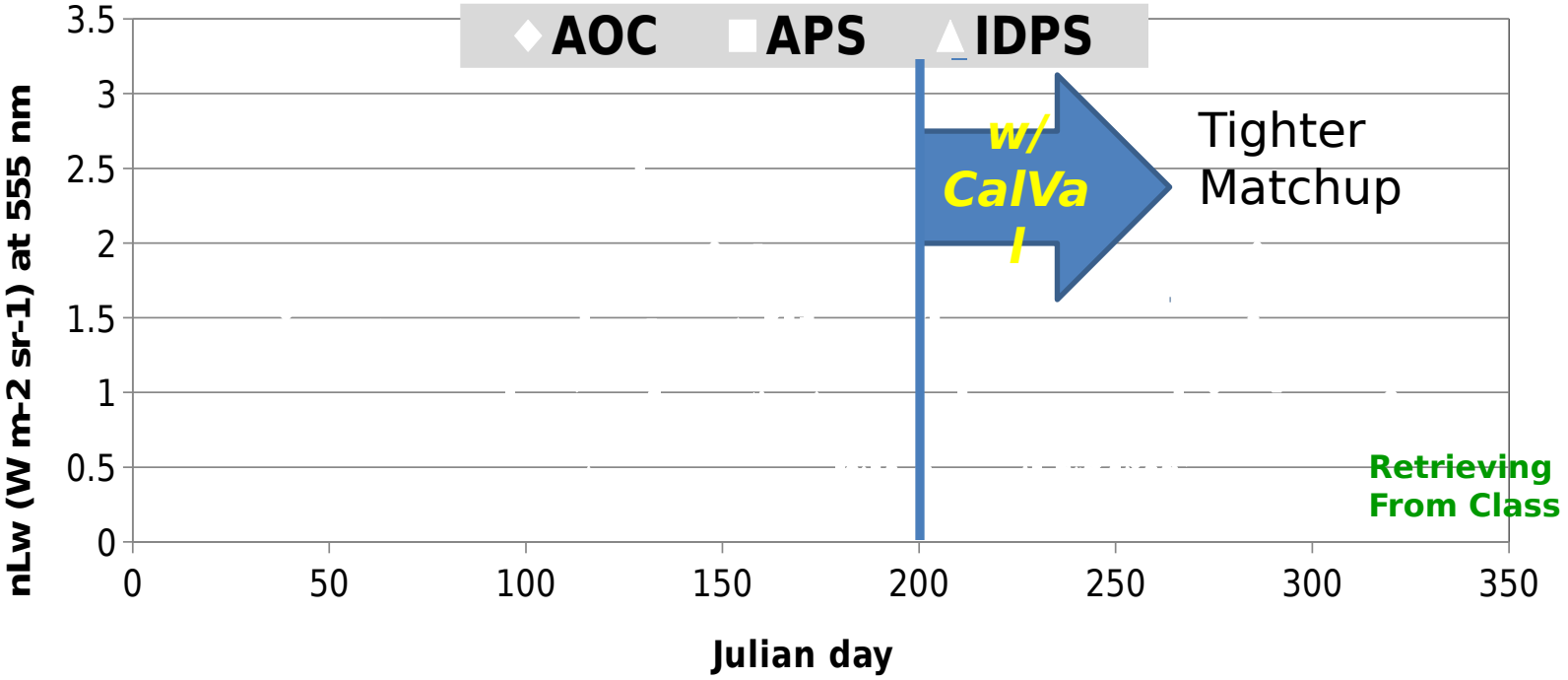


STATS TABLE

488

AAOT 555nm nLw Time Series 2013 Adriatic Sea



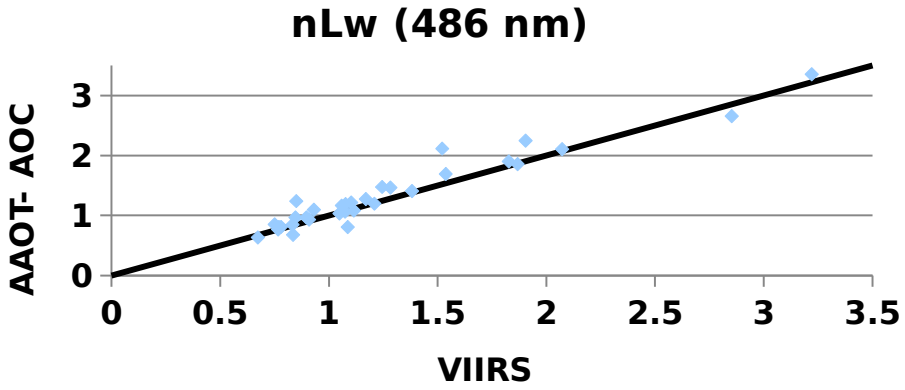
Matchup Constraints (Very aggressive – Only use pristine data for cal/val:)

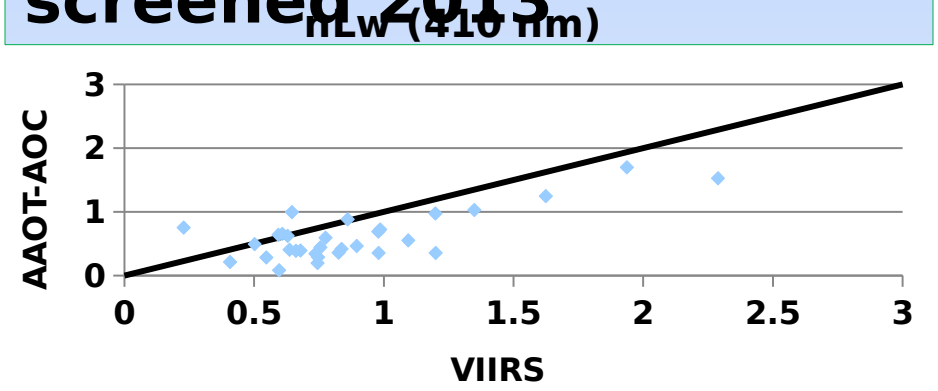
Exclusion Criteria: +/- 3hrs; Max SatZA = 56°; Max SolZA = 70°; 50% valid pixels; wind < 8m/s; max AOT 0.2

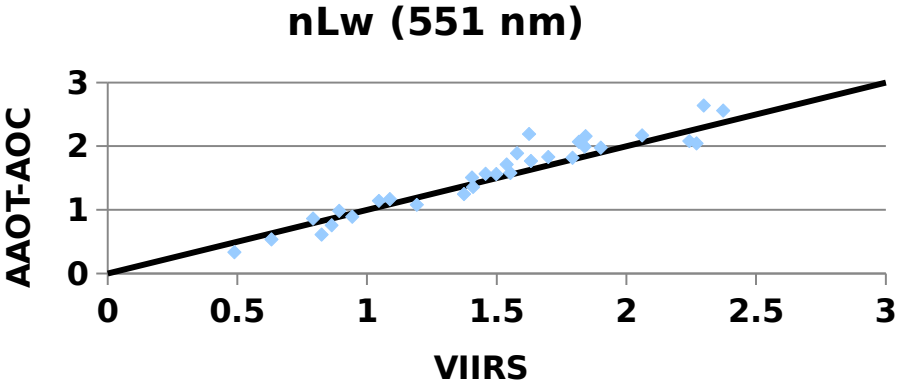
Satellite Flags: Atmos fail; High LT; cloud/ice; sea ice; low nLw; land; hi satZ; hi solZ; nav fail, High glint; max AER iteration, epsilon out of range; Moderate glint

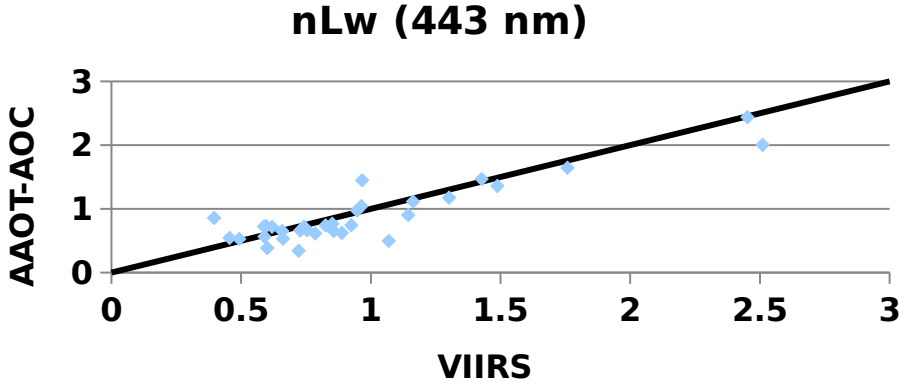
**the APS to VOCCO matchups are not screened for wind speed or*

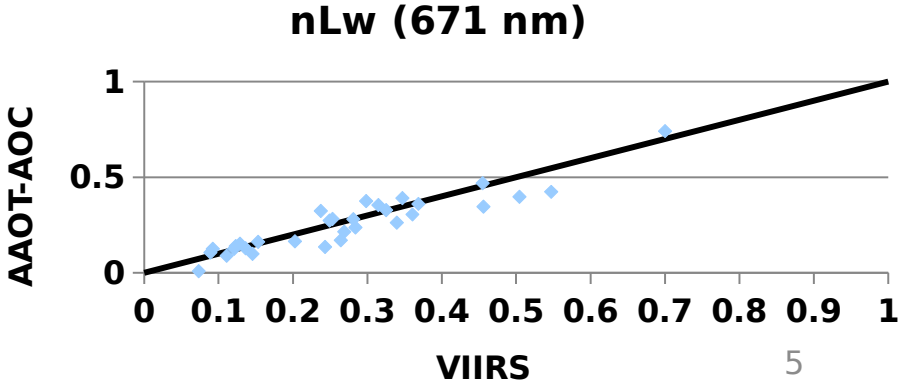
Spectral response Matchup
AAOT: APS VIIRS vs SeaPrism nLw, screened 2013











Gains
No Vical

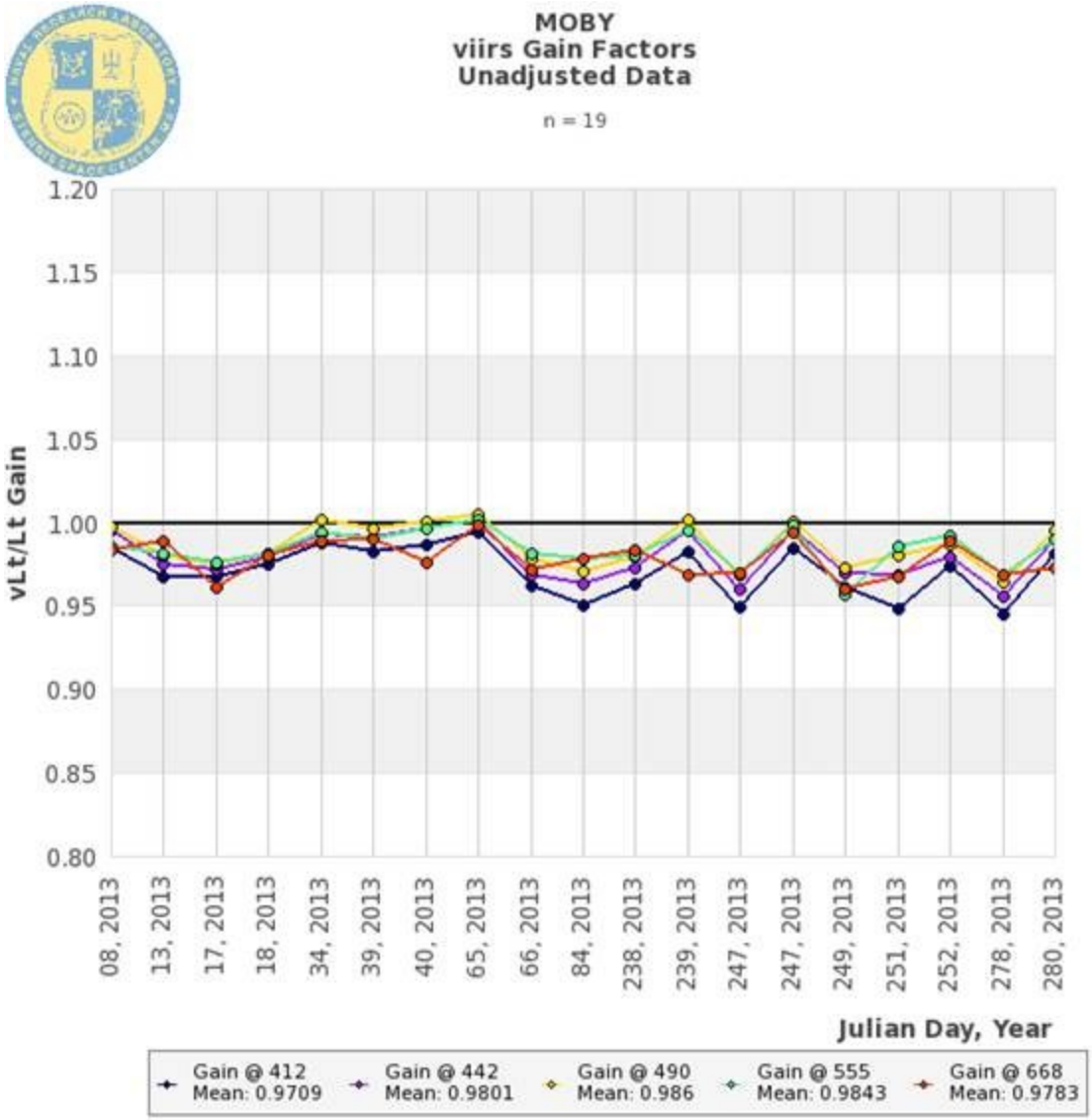


Figure 2 shows the vLt/Lt over time using unity gains. In a perfect system in which all components are computed accurately, the original Lt and vicarious Lt should have a ratio of 1.0. Most of the ratios are below the 1.0 line suggesting the sensor without vicarious calibration is slightly high. The mean gain for the 412, 442, 490, 555, and 668 channels are 0.9709, 0.9801, 0.9860, 0.9843, and

Gains
with Vical

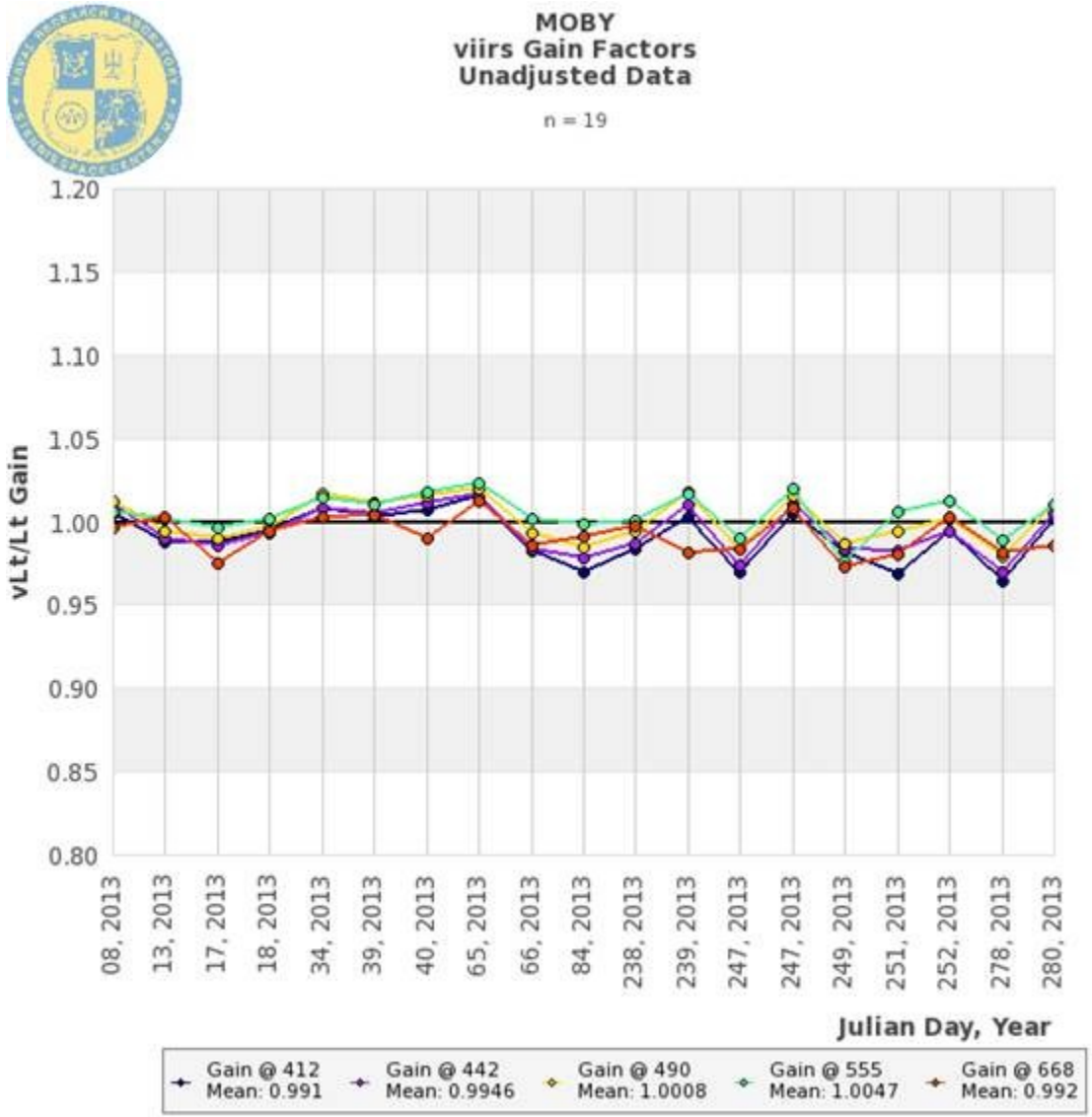
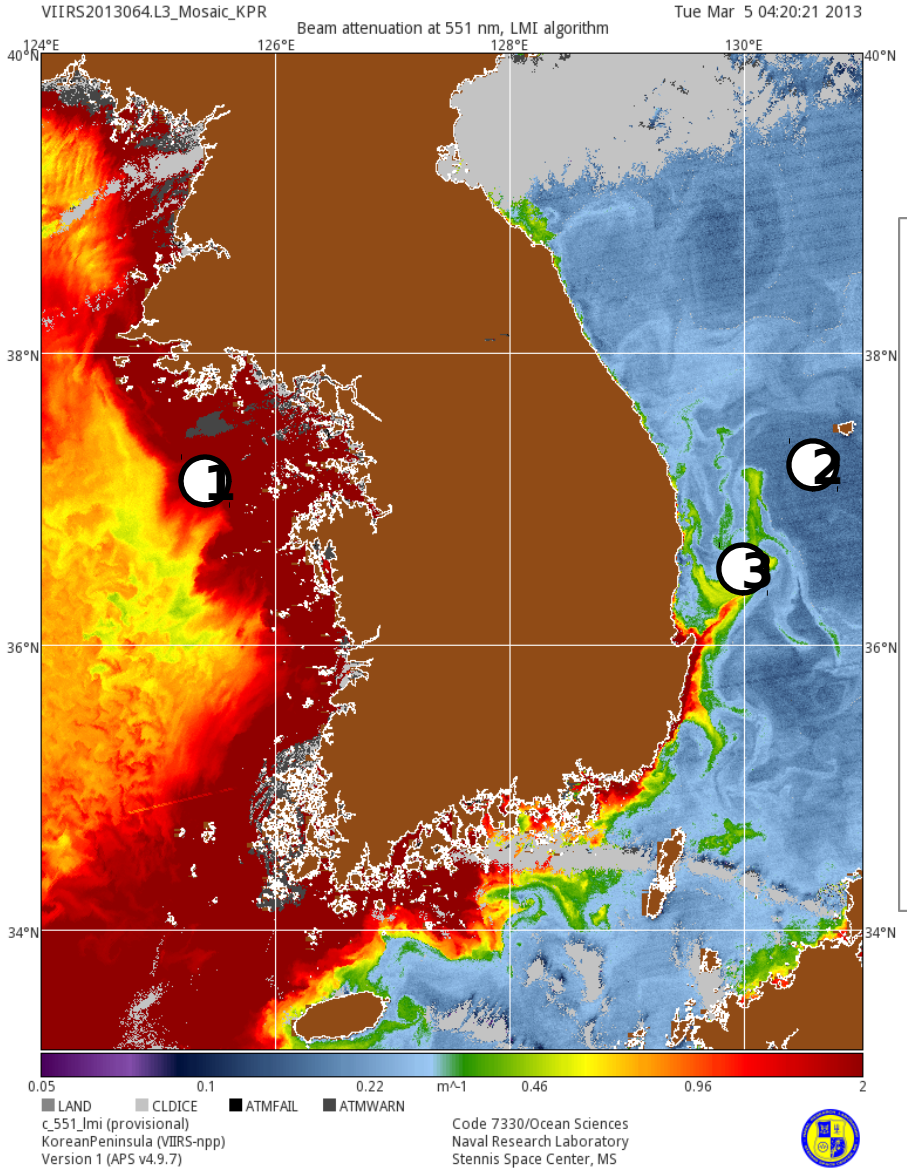
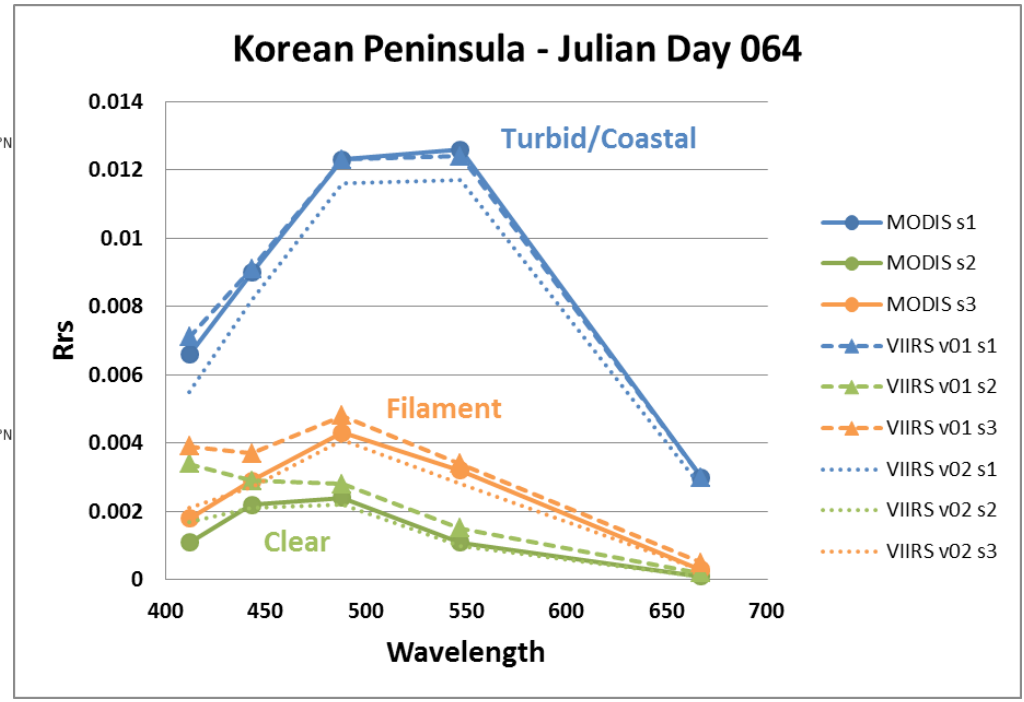


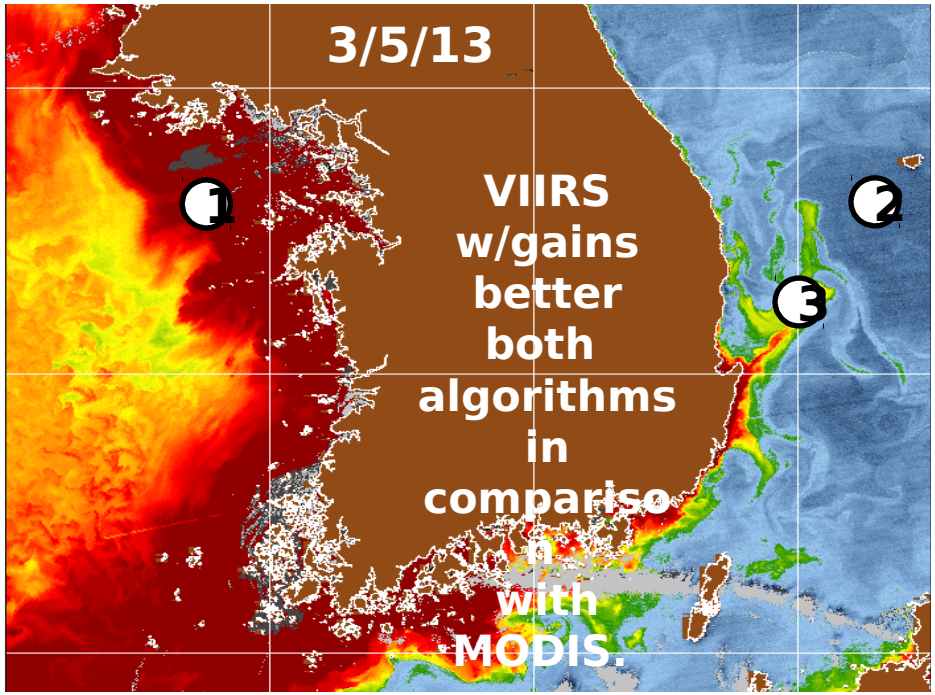
Figure 3 shows the vLt/Lt relationship over time by processing the MOBY imagery with the vicarious calibration coefficients. The ratios vary around the 1.0 line suggesting the sensor with vicarious calibration is on average performing better than it does with unity gains. The mean gain for the 412, 442, 490, 555, and 668 channels are 0.9910, 0.9946, 1.0008, 1.0047, and 0.992 respectively.

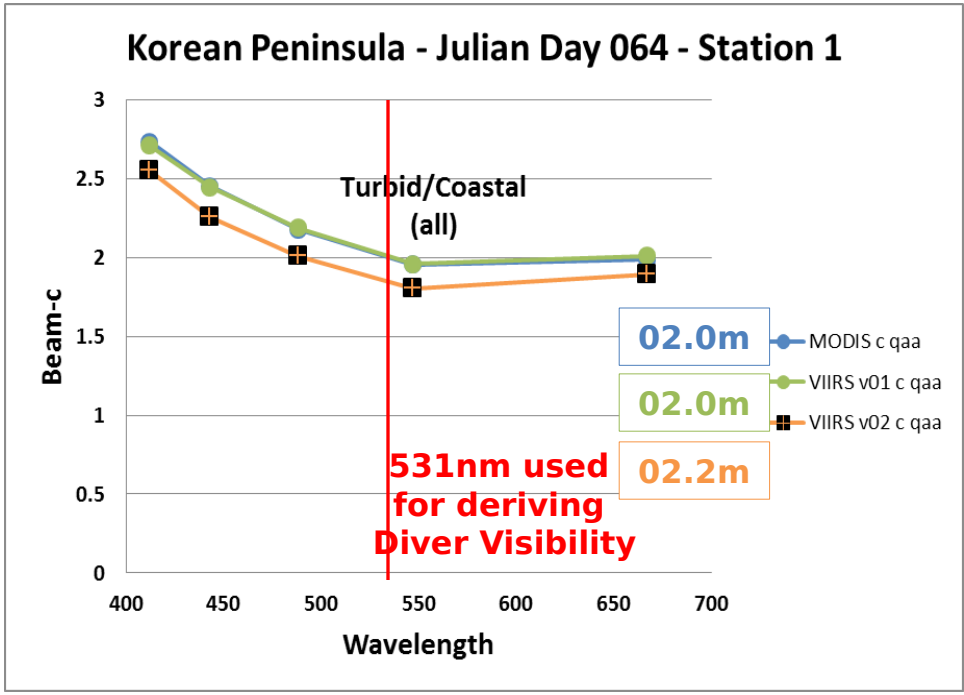
Korean Peninsula – March 5, 2013 – QAA vs LMI – MODIS vs VIIR
AOPS v4.10

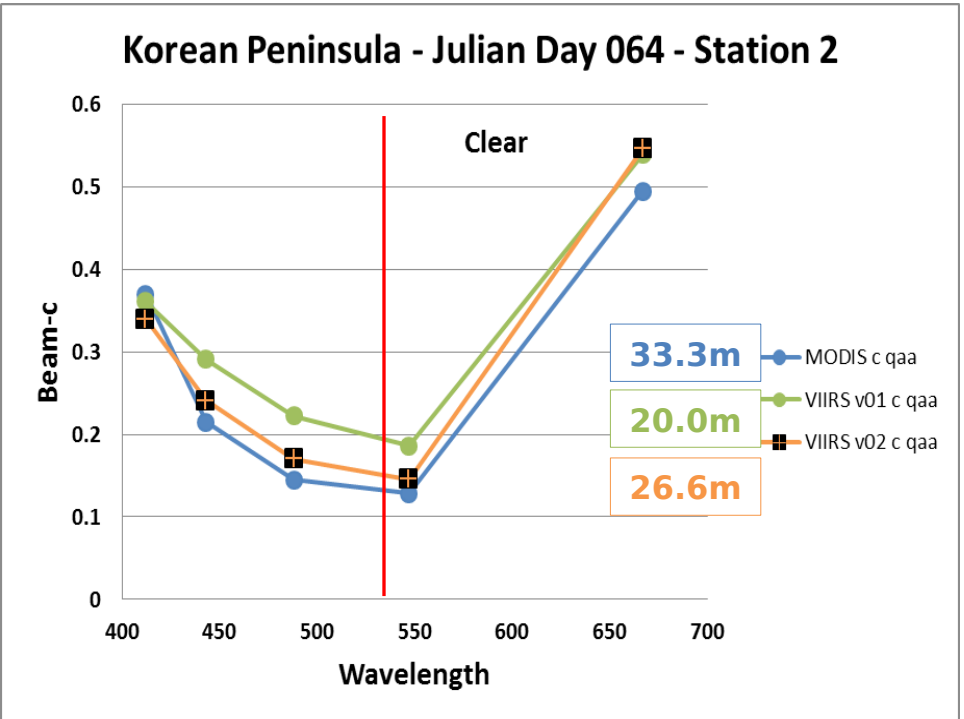


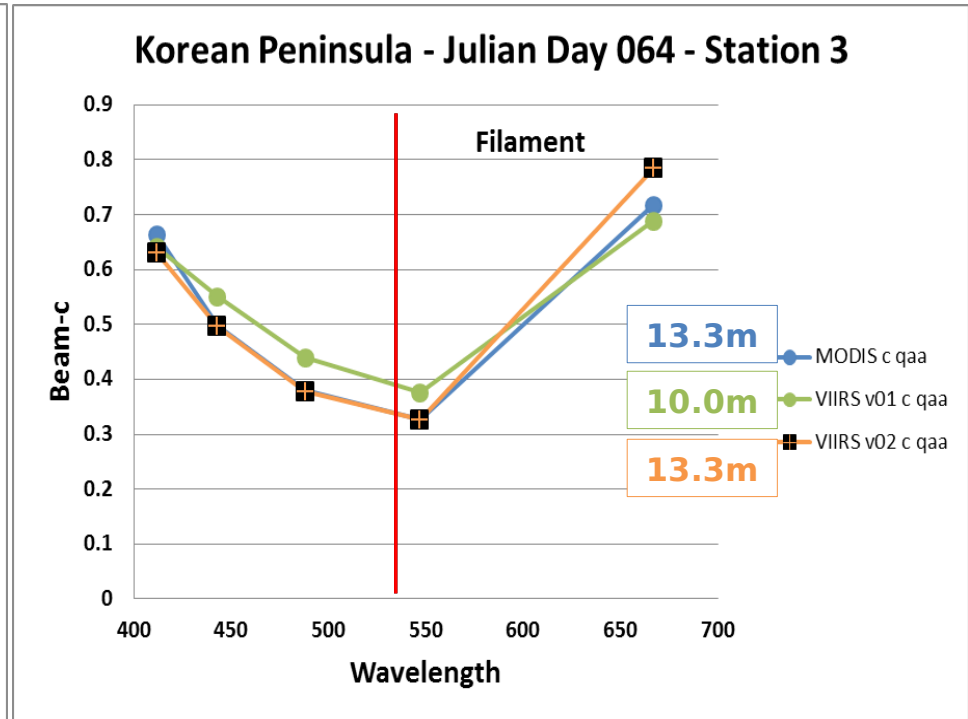
VIIRS(gains) vs, MODIS Rrs improvement at stations 2 & 3 in comparison to MODIS



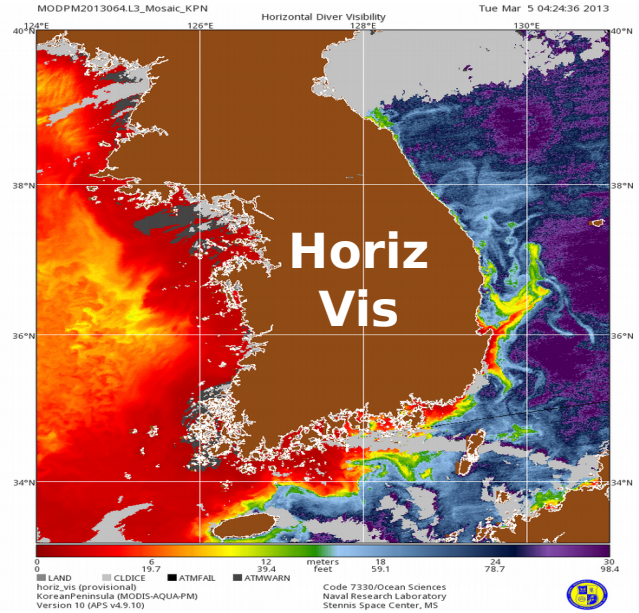

3/5/13
1
2
3
VIIRS w/gains better both algorithms in comparison with MODIS.

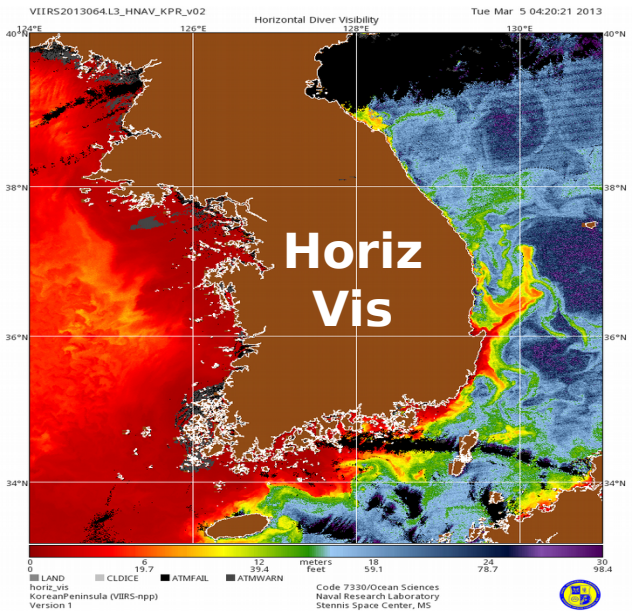

Korean Peninsula - Julian Day 064 - Station 1
Turbid/Coastal (all)
531nm used for deriving Diver Visibility
02.0m
02.0m
02.2m
MODIS c qaa
VIIRS v01 c qaa
VIIRS v02 c qaa
Beam-c
Wavelength
0
0.5
1
1.5
2
2.5
3
400
450
500
550
600
650
700

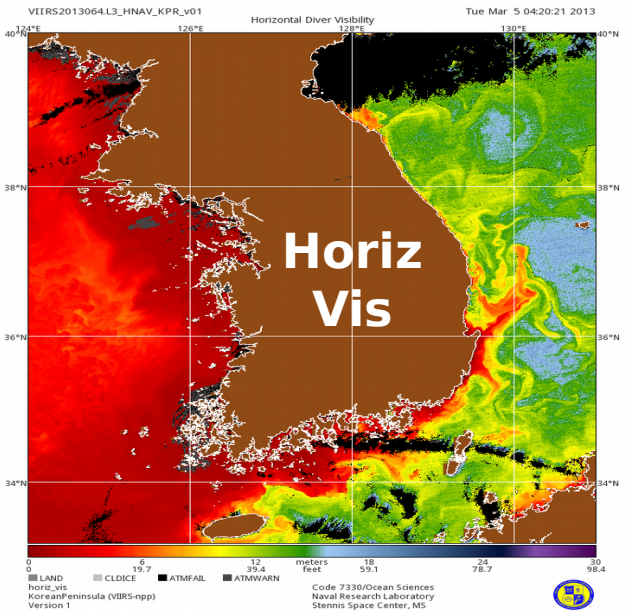

Korean Peninsula - Julian Day 064 - Station 2
Clear
33.3m
20.0m
26.6m
MODIS c qaa
VIIRS v01 c qaa
VIIRS v02 c qaa
Beam-c
Wavelength
0
0.1
0.2
0.3
0.4
0.5
0.6
400
450
500
550
600
650
700

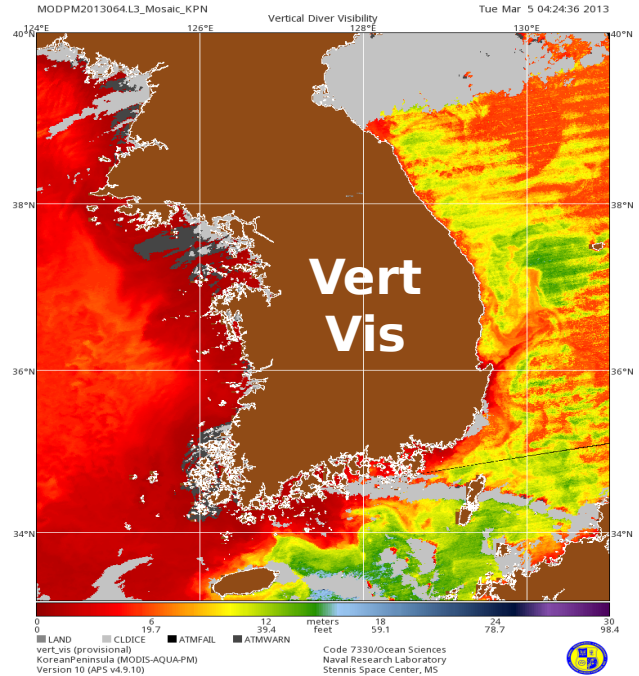

Korean Peninsula - Julian Day 064 - Station 3
Filament
13.3m
10.0m
13.3m
MODIS c qaa
VIIRS v01 c qaa
VIIRS v02 c qaa
Beam-c
Wavelength
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
400
450
500
550
600
650
700

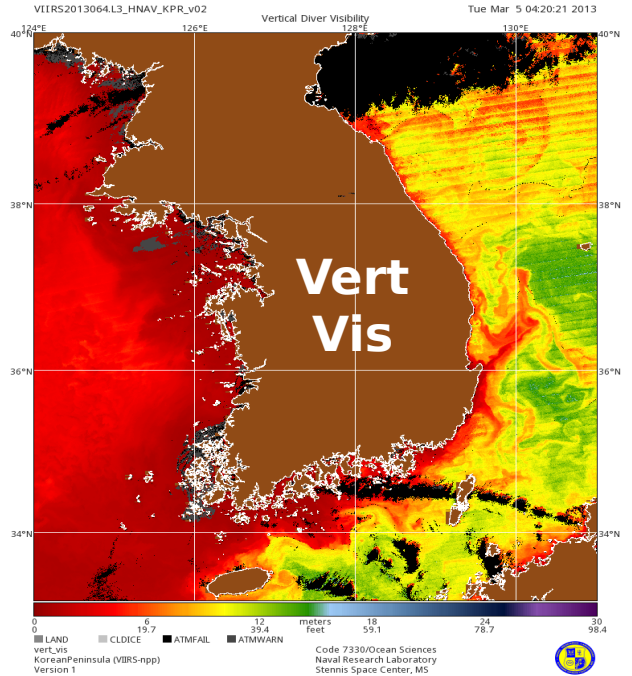
...OIS 3/5/13 VIIRS (v02) VIIRS

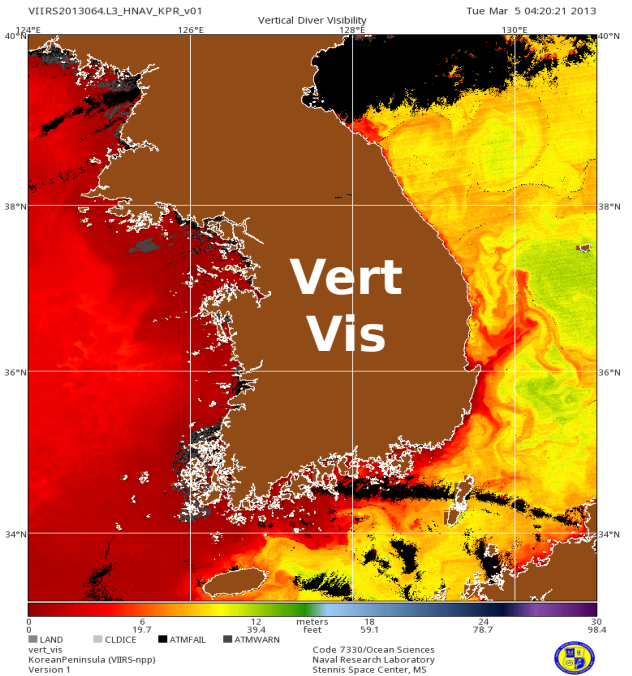




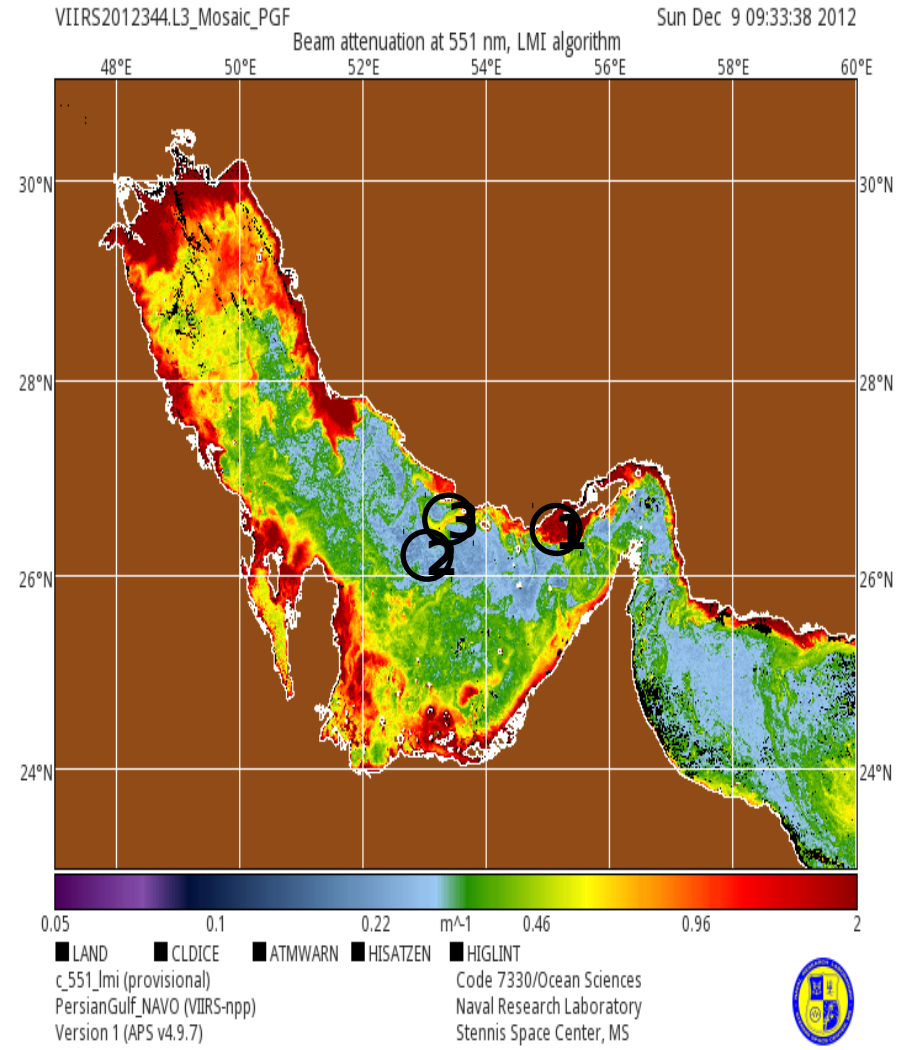




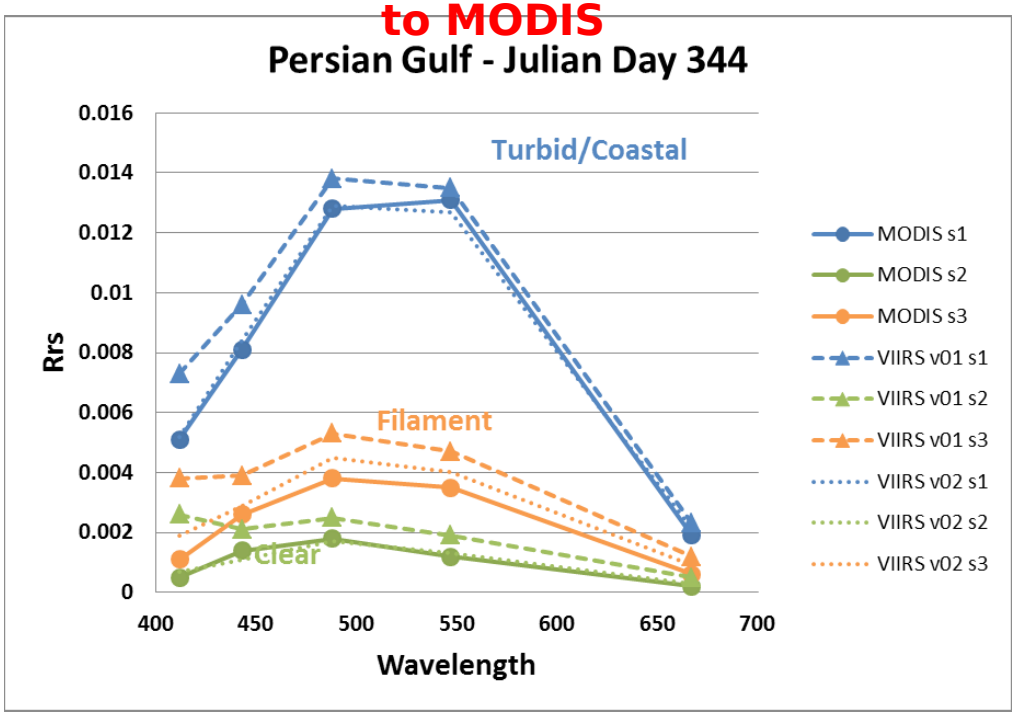


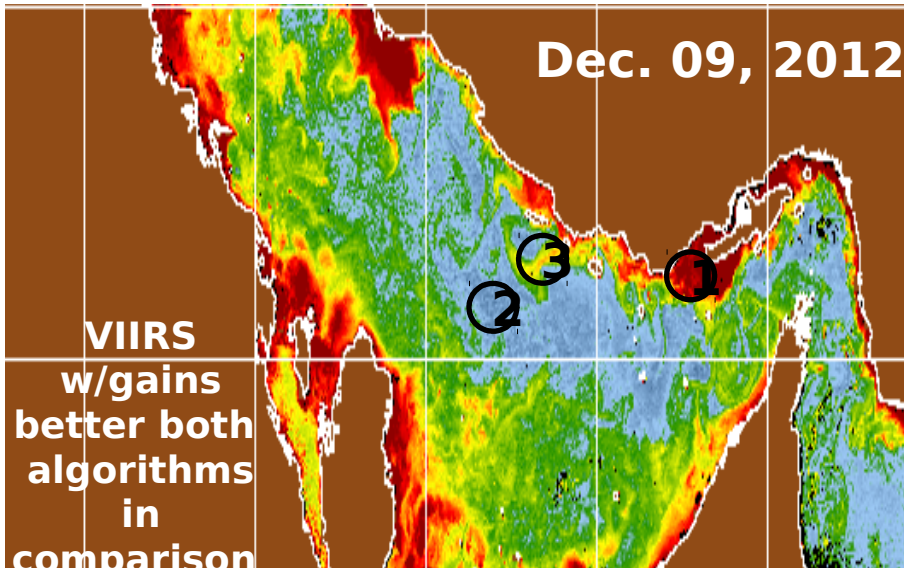


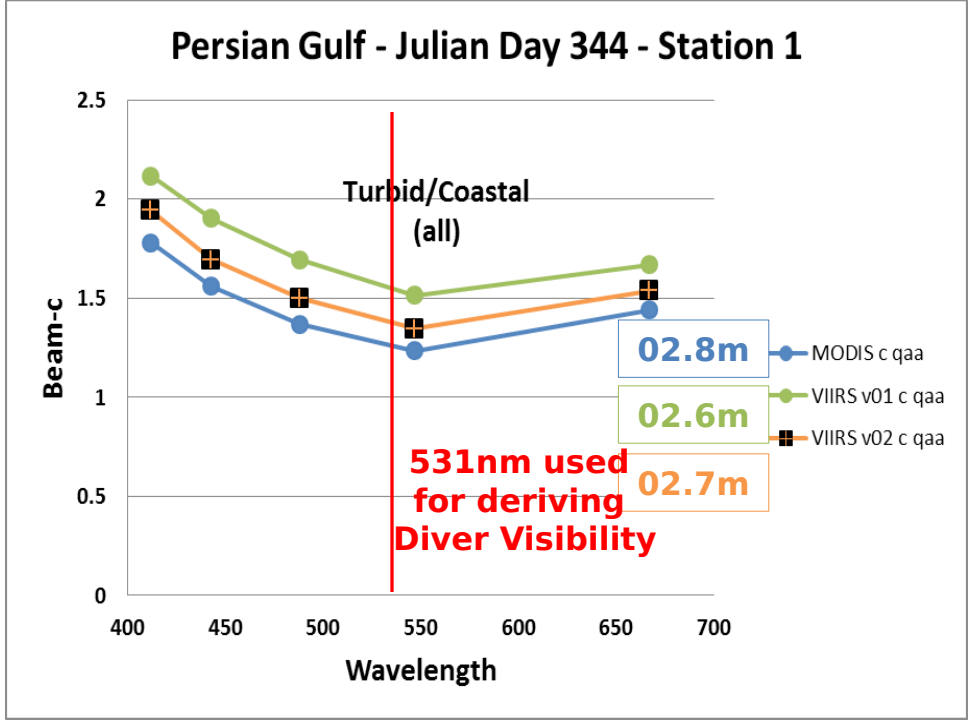
Persian Gulf – December 09, 2012 – QAA vs LMI – MODIS vs VIIRS

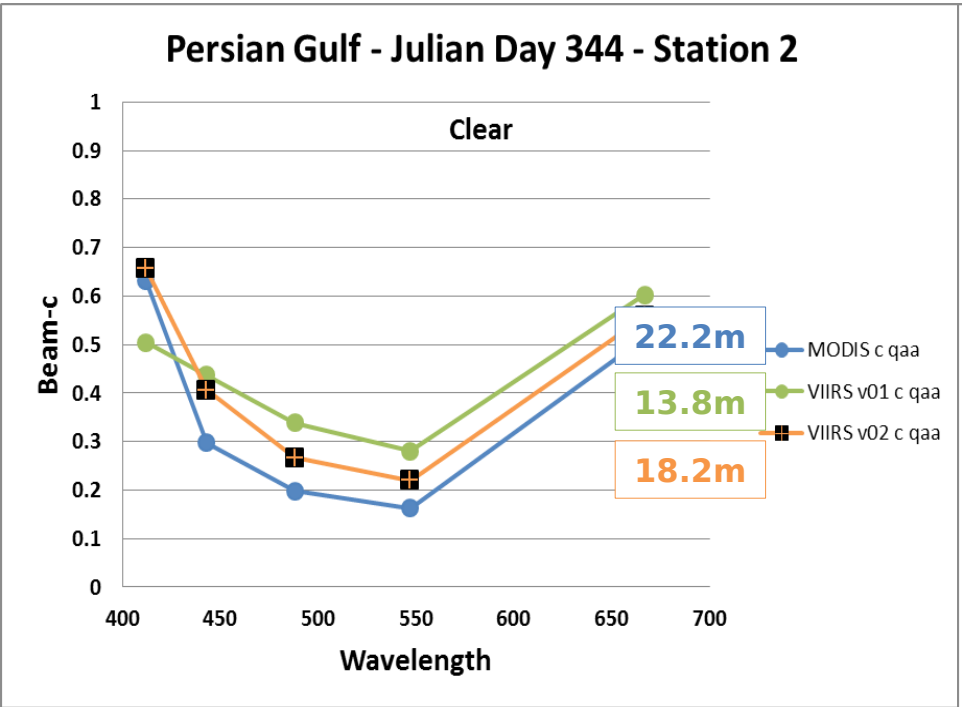


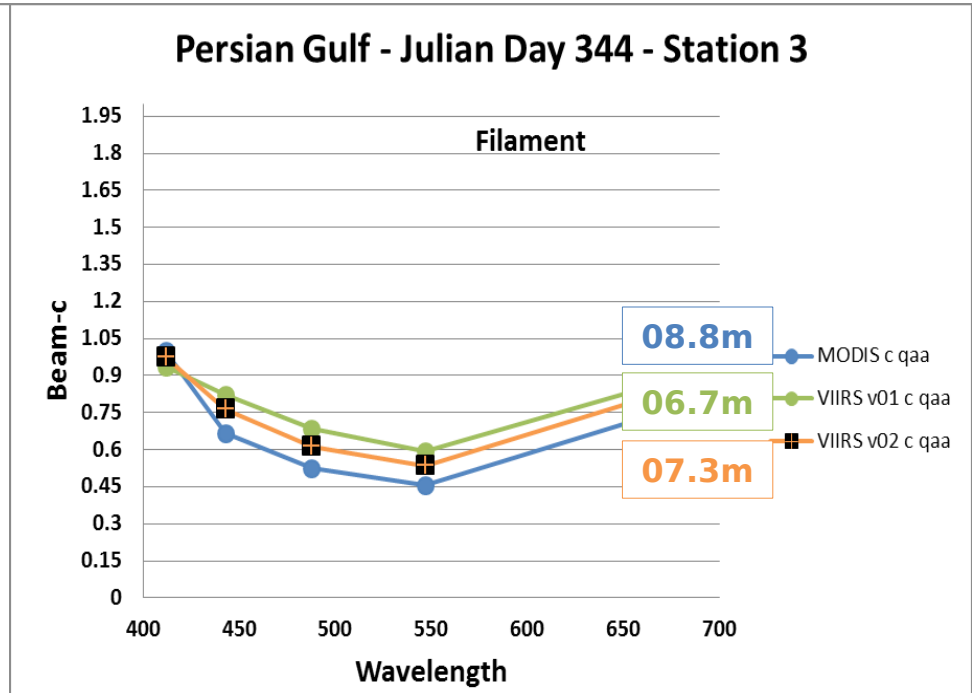
VIIRS(gains) vs, MODIS Rrs improvement in comparison to MODIS

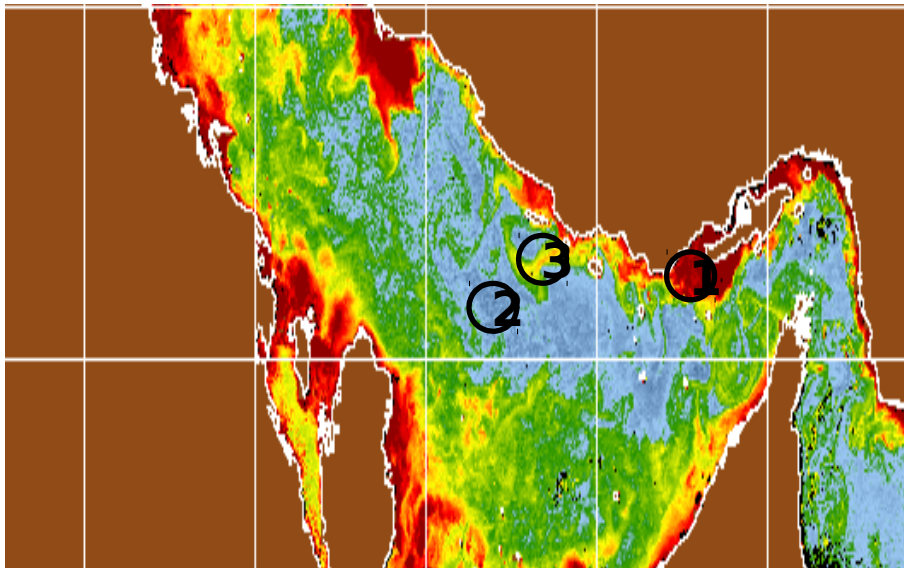


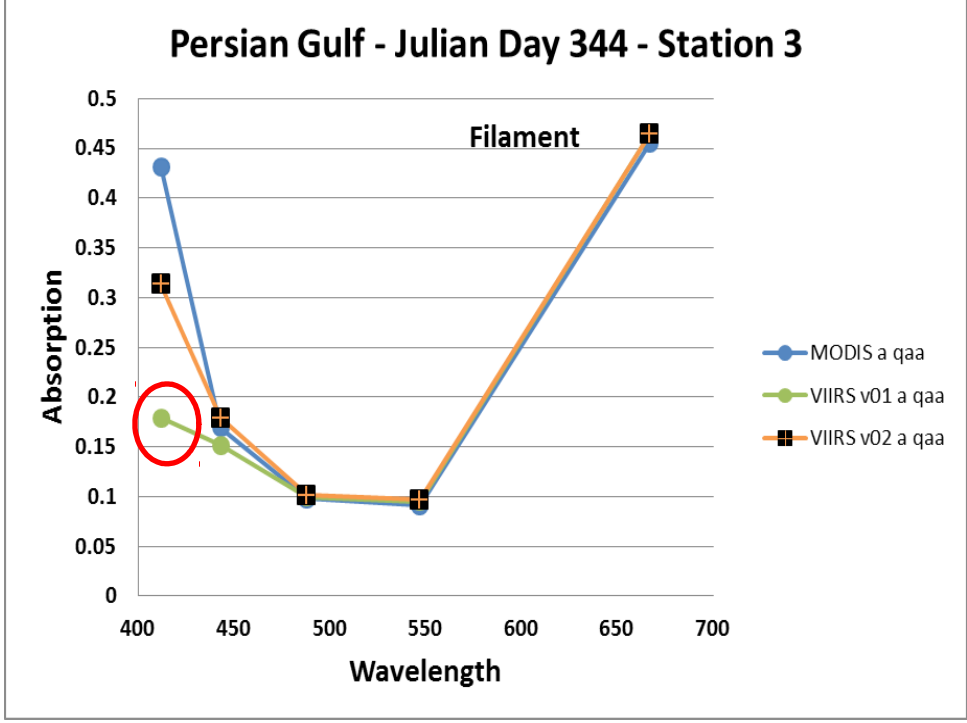

Dec. 09, 2012
VIIRS w/gains better both algorithms in comparison
1
2
3

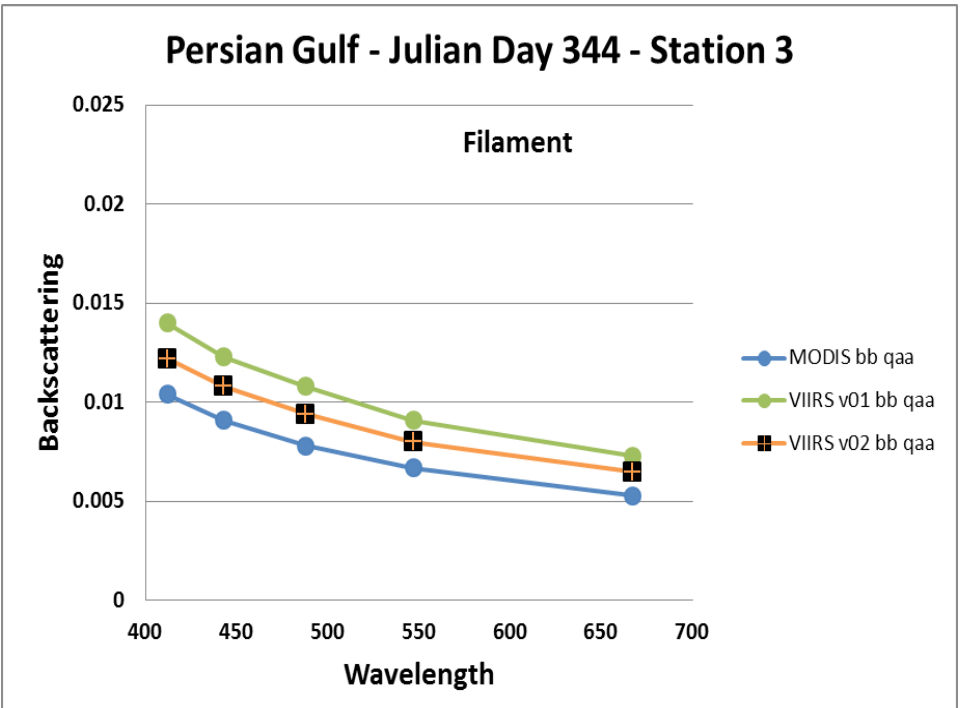

Persian Gulf - Julian Day 344 - Station 1
Turbid/Coastal (all)
531nm used for deriving Diver Visibility
02.8m
02.6m
02.7m
MODIS c qaa
VIIRS v01 c qaa
VIIRS v02 c qaa
Beam-c
Wavelength
2.5
2
1.5
1
0.5
0
400
450
500
550
600
650
700


Persian Gulf - Julian Day 344 - Station 2
Clear
22.2m
13.8m
18.2m
MODIS c qaa
VIIRS v01 c qaa
VIIRS v02 c qaa
Beam-c
Wavelength
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
400
450
500
550
600
650
700


Persian Gulf - Julian Day 344 - Station 3
Filament
08.8m
06.7m
07.3m
MODIS c qaa
VIIRS v01 c qaa
VIIRS v02 c qaa
Beam-c
Wavelength
1.95
1.8
1.65
1.5
1.35
1.2
1.05
0.9
0.75
0.6
0.45
0.3
0.15
0
400
450
500
550
600
650
700


1
2
3

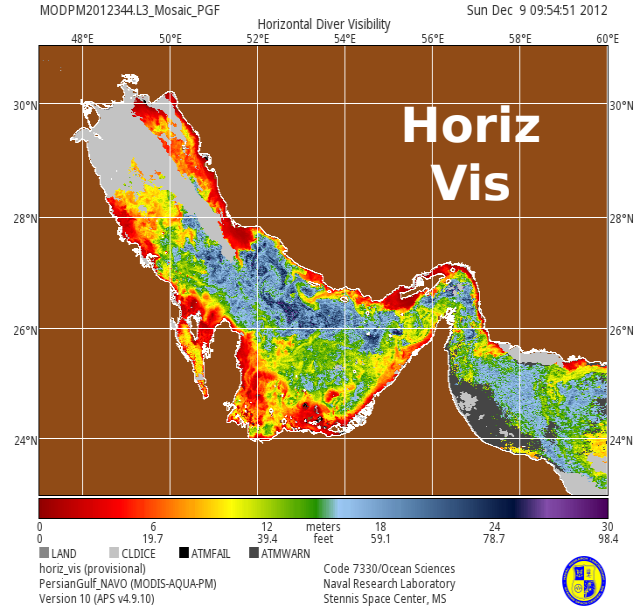

Persian Gulf - Julian Day 344 - Station 3
Filament
Absorption
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
400
450
500
550
600
650
700
Wavelength
MODIS a qaa
VIIRS v01 a qaa
VIIRS v02 a qaa

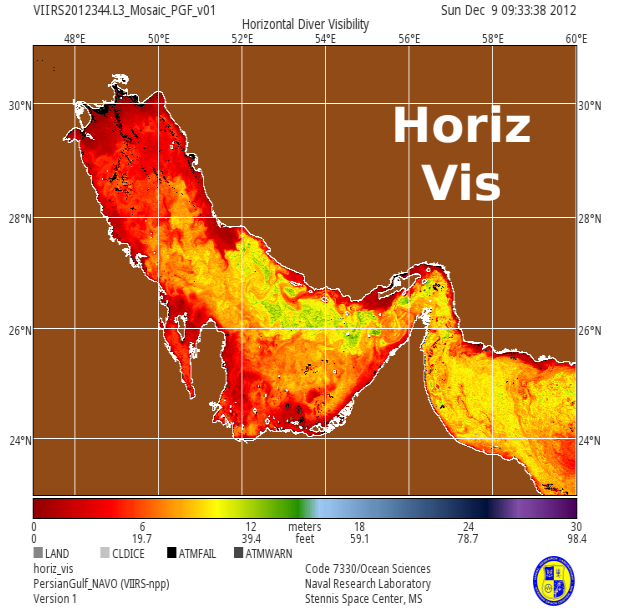

Persian Gulf - Julian Day 344 - Station 3
Filament
Backscattering
0.025
0.02
0.015
0.01
0.005
0
400
450
500
550
600
650
700
Wavelength
MODIS bb qaa
VIIRS v01 bb qaa
VIIRS v02 bb qaa

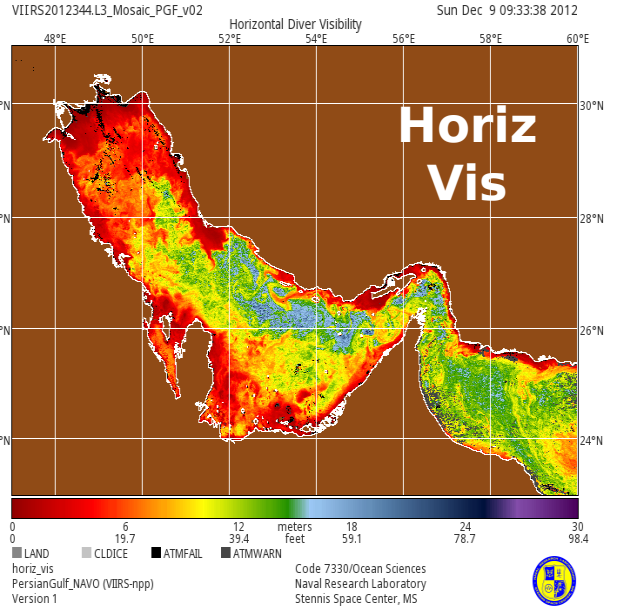
MODIS Horiz Visibility

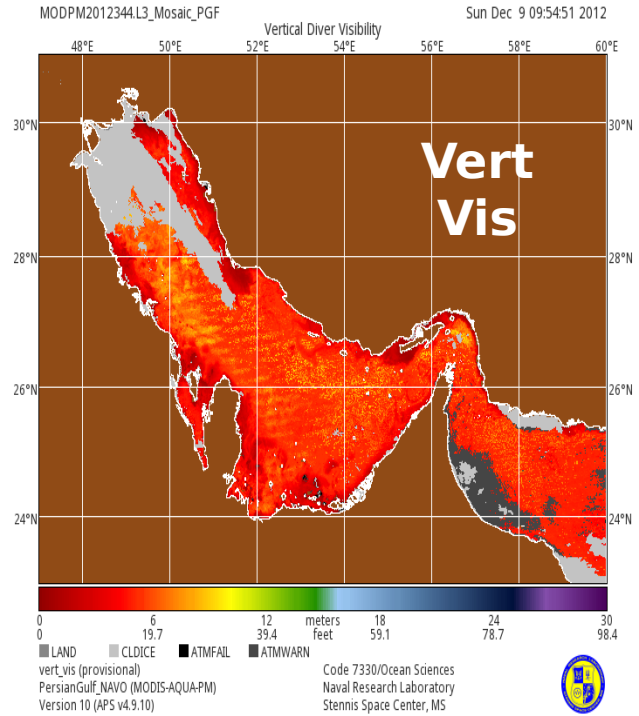
VIIRS Horiz Visibility (v01)

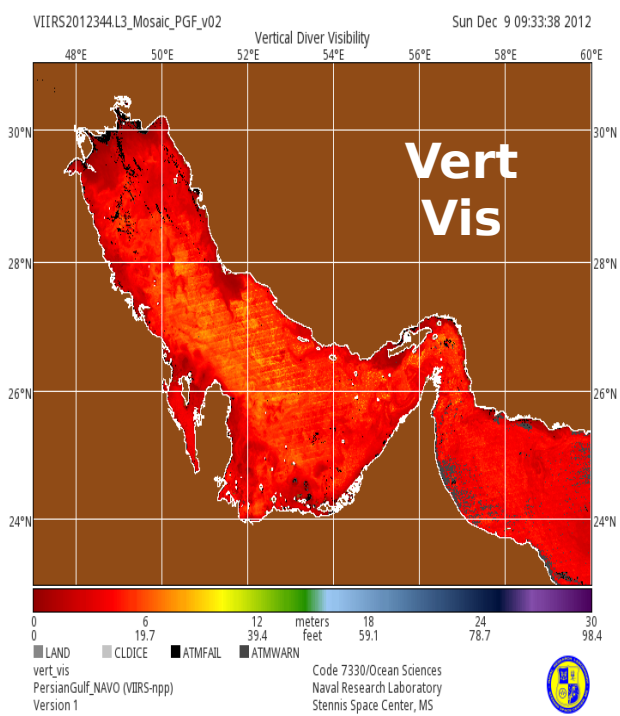
VIIRS Horiz Visibility

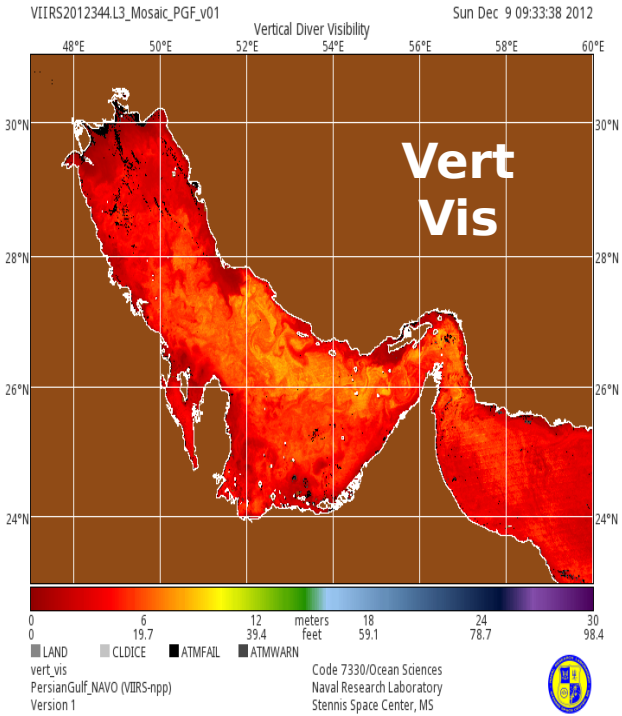




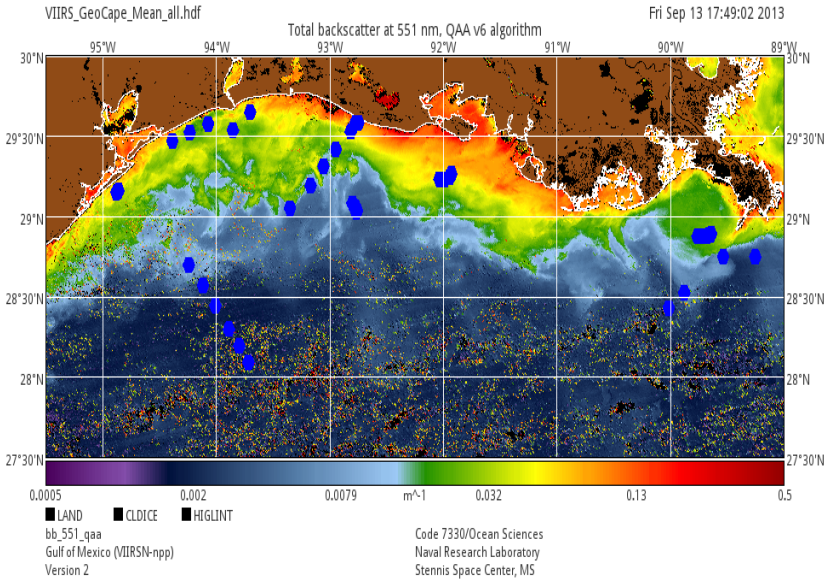


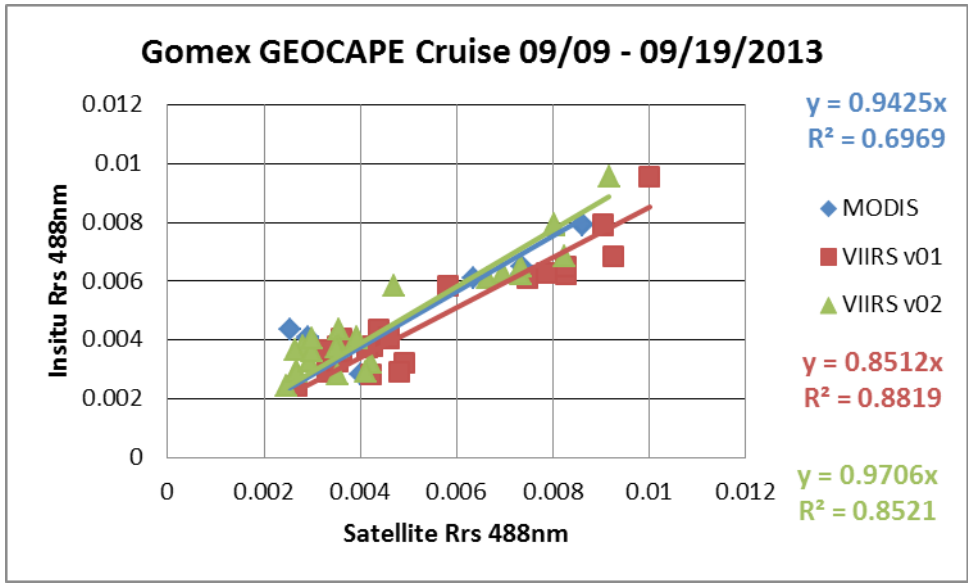


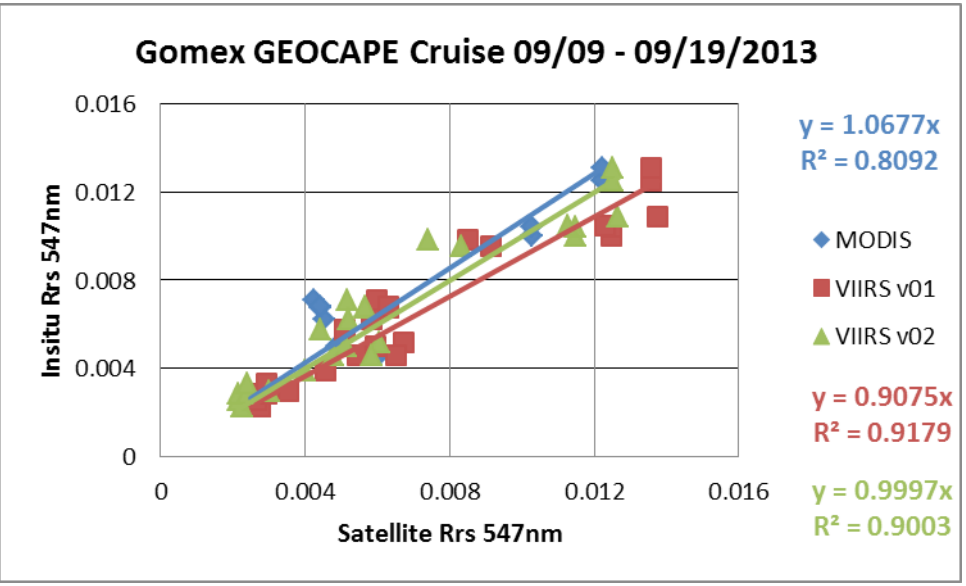




GEOCAPE / Northern Gulf of Mexico Cruise July 9-19, 2013 - Scat





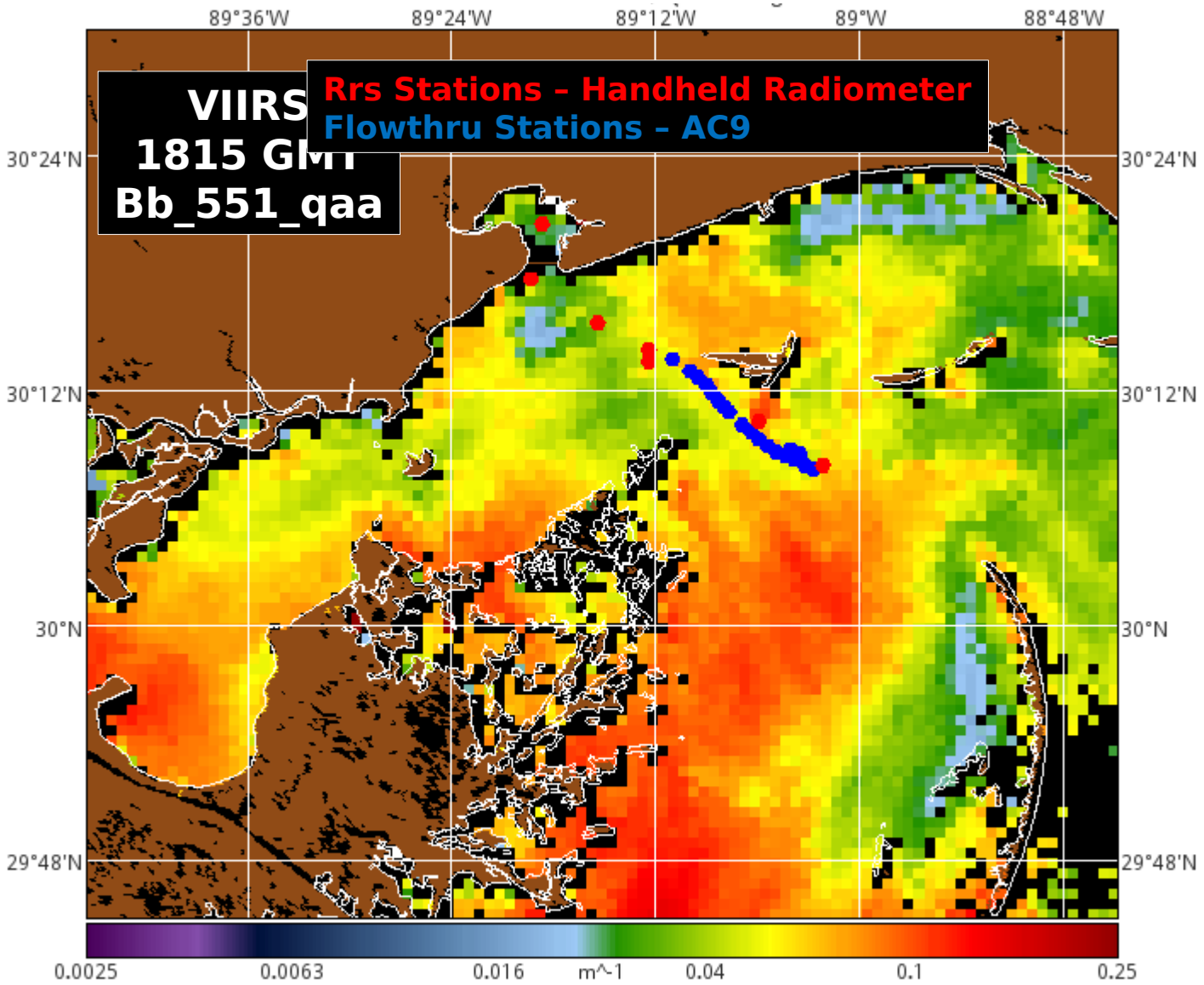


Slope	rrs412	rrs443	rrs488	rrs547
MODIS	0.85	0.82	0.94	1.07
VIIRS v01	0.5	0.72	0.85	0.91
VIIRS v02	0.79	0.91	0.97	0.99

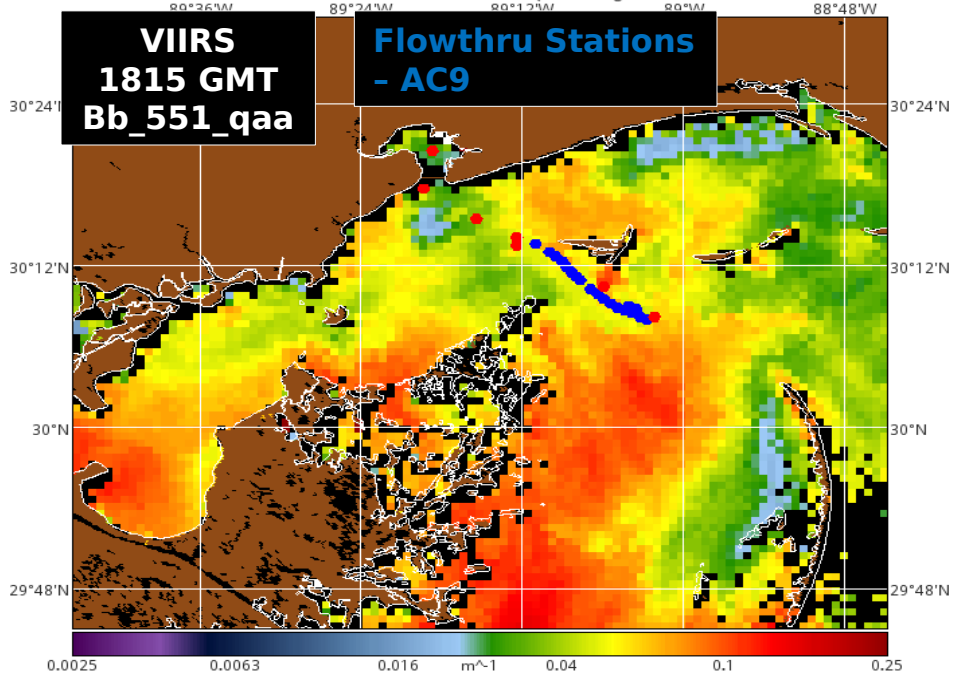
Rsquared	rrs412	rrs443	rrs488	rrs547
MODIS	0.91	0.86	0.85	0.86
VIIRS v01	0.44	0.77	0.89	0.92
VIIRS v02	0.40	0.78	0.88	0.92

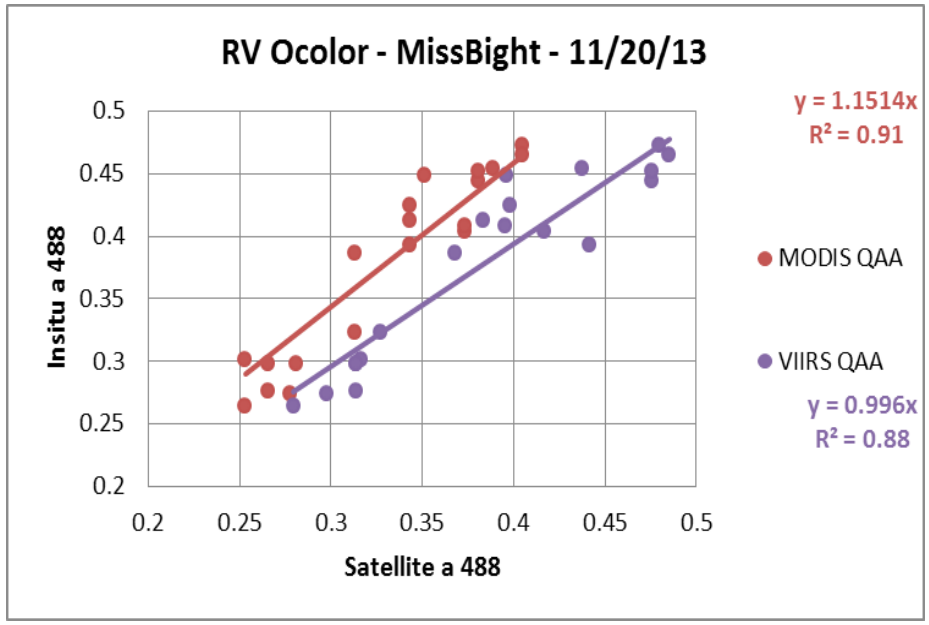
Both VIIRS and MODIS 412 a little o**ffnsitu: UMASS/NOAA**

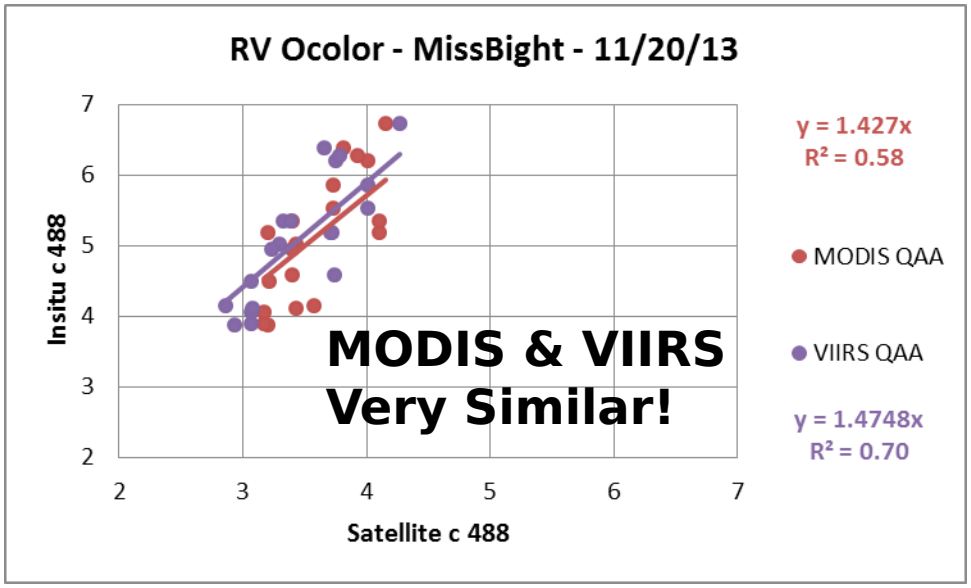
cean Color Cruise – November 20, 2013 – Mississippi S
and IOP (Surface FlowThru +/- 30 Minutes from Satell



R/V Ocean Color Cruise Mississippi Sound November 20, 2013







SLOPE	a412	a443	a488	a547	c412	c443	c488	c547
MODQAA	1.48	1.38	1.15	0.88	1.41	1.43	1.43	1.43
VIIRSQAA	0.85	1.05	0.99	0.83	1.37	1.47	1.48	1.47
R2	a412	a443	a488	a547	c412	c443	c488	c547
ModQAA	0.90	0.91	0.91	0.84	0.59	0.59	0.58	0.58
VIIRSQAA	0.80	0.90	0.88	0.79	0.71	0.72	0.70	0.70

GOCI